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10/761,884	01/20/2004	Eric R. Schott	EQLC-P01-005	4233

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EXAMINER

DOAN, DUC T

ART UNIT	PAPER NUMBER
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2188

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/761,884

Applicant(s)

SCHOTT, ERIC R.

Examiner

Duc T. Doan

Art Unit

2188

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 April 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4, 8-14, 18-20 and 22-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 8-14, 18-20, 22-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date March 23, 2007 and April 23, 2007
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set for in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/23/07 has been entered.

Claims 1-31 have been presented for examination in this application. In response to the last office action, claims 1,11,19, have been amended, claims 5-7,15-17,21 have been canceled. As the result, claims 1-4,8-14,18-20,22-31 are now pending in this application.

Claims 1-4,8-14,18-20,22-31 is rejected.

Applicant's arguments filed 4/23/07 have been fully considered but they are not persuasive. Therefore, the rejections from the previous office action are respectfully maintained, with changes as needed to address the amendments.

Information Disclosure Statement

The Information Disclosure Statement(s) received 3/23/07 4/23/07 have been considered. Please see attached PTO-1449(s).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4,8-14,18-20,22-31 rejected under 35 U.S.C. 103(a) as being unpatentable over Umberger et al (US 6957433), in view of Hinshaw et al (US 2004/012842), and further in view of Bruning, III et al (Us 2002/0035667)..

As in claim 1, Umberger describes a system for providing differentiated classes of storage (different RAID levels in a RAID storage system; I/O data transfer operation in place Umberger's column 13 lines 27-35), comprising a storage device having a plurality of storage locations and a logical block name space for organizing the storage locations (Umberger's column 8 line 62 to column 9 line 3 discloses storage locations are organized into logical block name space using logical bock names),

Umberger further discloses a performance process for determining a level of performance for the plurality of storage locations and partitioning the plurality of storage locations into a plurality of regions as determined by their different levels of performance (Umberger's column 8 lines 62-67 discloses a performance process that determines the performance of storage locations, the performance is based on the speed of accessing storage locations, and/or based on the redundancy amount implemented for storage locations).

Umberger does not expressly disclose performance associating with regions of storage location. However, Hinshaw's paragraph 4 discloses a performance method in which storage locations are further partitioned into segments "regions"; each region has a different level of performance (tracks on inner side of disk, shorter, accessed faster). It would have been obvious to one of ordinary skill in the art at the time of invention to partition/assign storage locations in

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regions based on the different levels of performances associated with storage locations in these regions, thereby increasing the access speed and improve the throughput of the overall system (see Hinshaw's paragraph 4, placing the mirror's data segments on short tracks, and thereby improving the general speed of accessing data in the system),

Umberger further discloses a mapping process for mapping the partitioned regions of storage locations and aggregating the logical block names of the storage locations in the partitioned regions having identical level of performance to the selected section of the logical block name space. Umberger further discloses a process in which storage locations distributed in stripes "regions" are being tracked, Umberger's column 11 lines 40-43; being mapped to logical block names of client/workloads' requests, (Umberger's column 8 line 67 to column 3 line 9).

Umberger and Hinshaw do not expressly disclose the claim's aspect of "aggregating the logical block names" and "thereby providing differentiated classes of storage to one or more clients accessing system". However, Bruning discloses a method in which regions of storage locations are aggregated into several partitioned regions having identical level of performance (Bruning's Fig 2, regions Fig 1A: #12, are aggregated into several partitioned regions, Fig 1A: #PL1-PL11, RL1-RL11, M1-M11 etc.; Bruning further teaches the regions are readily organized into several RAID groups to further providing differential classes of storage to one or more clients accessing the system, see Bruning's paragraph 13). It would have been obvious to one of ordinary skill in the art at the time of invention to include method of organizing array of storage devices as suggested by Bruning into Umberger's system modified by Hinshaw thereby further providing an efficient way for several users accessing data in the system with different classes of storage using various RAID organizing techniques, Bruning's paragraphs 4, 12).

As in claim 2, Umberger discloses the performance process separates the plurality of storage locations into a plurality of categories as determined by their different levels of performance (Umberger's column 12 lines 32-44 discloses a performance process that stores data in a storage system with different RAID categories as determined by their different levels of performance).

As in claim 3, Umberger further discloses wherein the different levels of performance representing different RAID level of performance, Umberger's column 12 lines 32-42 storing data into different RAID categories which inherently having different levels of performances, for example, data in RAID0 is not as reliable as RAID1; and data in RAID1 having higher throughput than data in RAID 5 (Umberger's column 8 lines 62-68, column 11 lines 32-40).

As in claim 4, Umberger and Hinshaw do not expressly disclosed the claim's limitations. However, Bruning further discloses the aggregated block names of Fig 1A: #12 corresponding to a common RAID level, for example a common RAID 5 set, paragraphs 18,23).

As in claim 8, Umberger and Hinshaw do not expressly disclosed the claims' limitations. However, Bruning further discloses a process for employing the storage to provide a file system service (Bruning's paragraph 4 to provide file system service such as storing e-mails for Microsoft Exchanging e-mail program).

As in claims 9-10, the claim recites a process for providing a storage volume service (claim 9; Umberger's column 11 lines 34-45 discloses a process to provide service such as data being stripped across disk's storage volumes); the mapping process creates multiple storage volumes at a selected level of performance (claim 10; Umberger's column 11 lines 34-45

discloses data blocks are mapped into multiple disk's storage volumes of RAID's storage system, wherein RAID 1 has higher performance than RAID 5).

Claims 11,19 rejected based on the same rationale as in the rejection of claim 1.

Claim 12 rejected based on the same rationale as in the rejection of claim 2.

Claim 13 rejected based on the same rationale as in the rejection of claim 3.

Claim 14 rejected based on the same rationale as in the rejection of claim 4.

Claim 18 rejected based on the same rationale as in the rejection of claim 10.

As in claim 20, Umberger discloses wherein the partitioning process selected a fixed set of partitions as a function of a selected configuration of system components (Umberger's column 12 lines 30-45 discloses a process to select disks and assigning them to fix set of partitions for RAIDs configurations).

As in claim 22, Umberger's column 8 lines 62-67 discloses wherein a level of performance includes a data access time, or a reliability of a storage location, or a combination thereof.

As in claim 23, Umberger does not expressly disclose the storage device is a single storage disk. However, Hinshaw's paragraph 5 further discloses the storage device is a single storage disk that comprises several partitions for several RAIDs configuration.

As in claims 24-25, Umberger discloses wherein the mapping process performs mapping and aggregating when the storage system is designed (claim 24; Umberger's column 12 lines 35-45 discloses disks are assigned to RAID configurations as it is designed) wherein the mapping process performs mapping and aggregating during operation of the storage device (claim 25;

Umberger's column 12 lines 45-66 further discloses during operations, the requests data can be mapped dynamically into different RAID configurations).

As in claim 26, Umberger does not expressly disclose the scanning aspect of the claim. However, Hinshaw's paragraph 4 further discloses the level of performance for the storage locations is readily determined by scanning for accessing time of various data storage locations of the disks.

As in claim 27, Hinshaw's paragraph 4 further discloses the level of performance for the storage locations is readily determined by scanning for accessing time of various data storage locations of the disks, for example accessing time of read and write operations issuing in a typical workload sampling.

Claim 28 rejected based on the same rationale as of claim 22.

Claim 29 rejected based on the same rationale as of claim 27.

Claims 30-31 rejected based on the same rationale as of claims 23-24 respectively.

Response to Arguments

Applicant's arguments in response to the last office action has been fully considered but they are not persuasive. Examiner respectfully traverses Applicant's arguments for the following reasons:

As to Applicant's remarks on pages 6-9 for the rejections of claims 1-4,8-14,18-20,22-31 under 35 U.S.C 103(a),

A) Regarding Applicant's remarks for current amending limitation "providing different classes of storage to clients of the system. Bruning further teaches the limitation as stated in the rationale of claim 1.

B) Examiner respectfully disagrees with Applicant's remarks that "Hinshaw does not determine any level of performance on the storage disk because it initially assumes, albeit incorrectly, that performance would increase by moving the mirrored data to the shorter tracks". Hinshaw clearly discloses an inventive method of organizing a storage device (i.e a disk) into various partitioned regions, for example primary partitioned region for fast response to request and secondary partitioned region for slower response. Recognizing data storing in several regions of a disk can provide different amount of data in a period of time, Hinshaw discloses that the differences of performance to accessing data storing in these regions should be measured so that they can be organized/mapped properly into corresponding storage system (i.e RAID storage system). Hinshaw's paragraph 4 lines 10-12 discloses that in one storage system, selecting shorter tracks for mirrored data would improve the overall storage system's performance. However, Hinshaw clearly teaches that, in another storage system, alternatively, selecting the longer tracks/outer tracks would improve the overall storage system performance. Thus, one should measures the overall transfer time of the these sectors/tracks in a particular system to select them properly, Hinshaw's paragraph 48.

C) Regarding the Applicant's remarks on motivation to combine Umberger with Hinshaw, Examiner maintains that one skills in the art would readily recognizing the storage device (i.e a disk) having partitioned regions with different performances and these regions should be organized into properly to the associating storage system as taught by Hinshaw (see

item B), thereby further improve the data throughput in the system while providing the reliability in the system with redundancy data.


Regarding Applicant's remarks of "using the mirror volume can be leveraged to service read requests when the main volume is too busy". Examiner would like to point out that the difference of objective does not defeat the case for obviousness because, as MPEP 2144 states, the "reason or motivation to modify a reference may often suggest what the inventor has done, but for a different purpose or to solve a different problem. It is not necessary that the prior art suggest the combination to achieve the same advantage or result discovered by applicant.

Conclusion

When responding to the office action, Applicant is advised to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist examiner to locate the appropriate paragraphs.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Duc T. Doan whose telephone number is 571-272-4171. The examiner can normally be reached on M-F 8:00 AM 05:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hyung S. Sough can be reached on 571-272-6799. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.


HYUNG SOUGH
SUPERVISORY PATENT EXAMINER
5-16-07